CLAIMS

1. A control loop diagnostic method comprising the steps of:

measuring an error in a control loop over time to determine a power spectral density of said error;

determining a best fit analytical function describing said power spectral density; and

measuring a diagnostic value from a difference between said best fit analytical function and said power spectral density of said error.

2. The method as claimed in claim 1, wherein said analytical function describes a poorly-tuned control loop exhibiting resonance around a resonant frequency.

3. The method as claimed in claim 2, wherein said analytical function is a second order approximation model defined by a natural frequency, a damping ratio and a variance.

4. The method as claimed in claim 3, wherein said analytical function is determined to have substantially a same intensity value for a peak around said natural frequency as said power spectral density and substantially a same slope on at least one side of said peak as said power spectral density.

5. The method as claimed in claim 4, wherein said analytical function is automatically determined from said power spectral density.

6. The method as claimed in claim 1, wherein said diagnostic value provides a classification indication of one of tuning error and malfunction of said control loop.

7. The method as claimed in claim 2, wherein said diagnostic value provides a classification indication of one of tuning error and malfunction of said control loop.

8. The method as claimed in claim 1, further comprising a step of determining from said difference whether corrective response is necessary.

9. The method as claimed in claim 2, further comprising a step of determining from said difference whether corrective response is necessary.

10. The method as claimed in claim 6, further comprising a step of determining from said difference whether corrective response is necessary.

11. The method as claimed in claim 7, further comprising a step of determining from said difference whether corrective response is necessary.

12. A computer program product having program data able to cause a computer to perform the steps of:

measuring an error in a control loop over time to determine a power spectral density of said error;

determining a best fit analytical function describing said power spectral density; and

measuring a diagnostic value from a difference between said best fit analytical function and said power spectral density of said error.

13. A computer program product as defined in claim 12, wherein said analytical function describes a poorly-tuned control loop exhibiting resonance around a resonant frequency.

14. A computer program product as defined in claim 13, wherein said analytical function is a second order approximation model defined by a natural frequency, a damping ratio and a variance.

15. A computer program product as defined in claim 14, wherein said analytical function is determined to have substantially a same intensity value for a peak around

said natural frequency as said power spectral density and substantially a same slope on at least one side of said peak as said power spectral density.

16. A computer program product as defined in claim 12, wherein said diagnostic value provides a classification indication of one of tuning error and malfunction of said control loop.

17. A computer program product as defined in claim 13, wherein said diagnostic value provides a classification indication of one of tuning error and malfunction of said control loop.